MONOPSONY, OLIGOPSONY, SOVIET BUYING BEHAVIOR, EXPORTER COOPERATION AND THE DETERMINATION OF WORLD GRAIN PRICES

ECONOMIC WORKING PAPERS

DOCUMENTS DE TRAVAIL ÉCONOMIQUES

Agriculture Canada

MONOPSONY, OLIGOPSONY, SOVIET BUYING BEHAVIOR, EXPORTER COOPERATION AND THE DETERMINATION OF WORLD GRAIN PRICES

BY

DR. JOHN R. GROENEWEGEN
OF THE COMMODITY MARKETS ANALYSIS DIVISION,
MARKETING AND ECONOMICS BRANCH,
AGRICULTURE CANADA

March 1, 1983

The views and implications expressed in this paper are not necessarily those of Agriculture Canada nor the Federal Government. The paper is a working paper released for discussion purposes only.

MONOPSONY, OLIGOPSONY, SOVIET BUYING BEHAVIOR, EXPORTER COOPERATION AND THE DETERMINATION OF WORLD GRAIN PRICES

Introduction

The present state of excessively burdensome grain stocks in the United States with the resulting rock-bottom price levels has focussed attention on actions within the United States to reduce stocks and thereby shore-up grain prices. Such policy resonses include various forms of export subsidies and export dumping as well as production controls. There is nothing inherently inappropriate with attempting to improve incomes in the farm sector and in this paper I do not advocate discontinuing attempts to improve income, albiet more appropriate attempts. Most of these U.S. policy responses impact on Canadian prices and/or Canadian export market share.

The thrust of these U.S. policy responses of cutting price to reduce stocks discounts any of the "monopolistic-monopsonistic powers" that can exist within the structure of the world grain market. (More appropriately this should be referred to as "obligopolistic - oligopsonistic powers). That is, recognition of the current "power" structure within the international grains market suggests possible exporter policy responses of not cutting price, increasing market share and expanding exports. Rather, the response could be one of cooperation between exporters, agreeing on market share, possibly discriminating between import regions, and imposing a price mechanism that extracts the economic rent, or surplus, accruing to the current holders of power -- the major importers.

The purpose of this paper is to develop and verify, to the degree possible, a model of world grain price determination. Following this, the paper explores implications of this model and the potential for shifting the oligopolistic-oligopsonistic power balance in favor of exporters.

Representations of World Grain Price Determination

Over the last 20 years the representations used to describe price determination in the world grain markets integrated monopoly, oligopoly, monopsony and oligopsony theory with the structure of the market. McCalla, and Taplin both had Canada and the United States as duopolists. Alouze, Watson and Sturgess extended this framework to include Australia in a triopoly arrangement with Canada as the price leader. These representations had exporters as the major influence in determining world grain prices. Carter and Schmitz turned the concept around and forwarded the hypothesis that the major wheat importers - particularly, Japan and the European Economic Community (EEC) set import tariffs in a fashion that approximates an optimal import tariff. The contribution of Carter and Schmitz is not that importers may purposefully set optimal import tariffs, but that the structure of the international grain market provides for oligopsonistic price determination. If this is the case, the market structure can possibly accommodate moving towards the direction of oligopolistic price determination. Schmitz et al took the implications of Carter and Schmitz and explored the applicability of an exporter cartel to return to exporters some of the economic rent extracted as a result of oligosonistic import buying.

Oleson focussed on the changing structure within the world wheat market and related price determination representations to specific structural periods and formations of market share. Oleson attributes the monopoly power of the Canadian Wheat Board (CWB) during the late 1950's and early 1960's to its willingness to hold stocks of high quality wheat away from importers and thus establish prices. As a result, suppliers of lower quality wheat followed the prices established by the CWB. Oleson's representation suggests that an informal North American cartel did exist up until the early 1960's.

In the period 1962 to 1972, the grain market structure is characterized by the United States' use of subsidies in relation to the CWB export price to expand market share. After 1972 any CWB market power was diminished since baking technology enabled larger utilization of lower quality blending wheats. This resulted in the United States becoming more and more the focus of price determination. Just as importantly, the holding of Canadian stocks of high quality wheat no longer influenced wheat prices and thus Canada had no price incentive to share the burden of holding stocks with the United States, the latter being the residual and major stockholder of grain.

The Current Structure of the World Grain Market

The detente obtained between the Soviet Union and the United States in the early 1970's and the subsequent foreign relations between them in combination with the United States moving to a flexible exchange rate regime were the two overriding and important events that have affected the structure of the international grain market. The first event put the Soviet Union into the market as a large and erratic importer of grain and thus made the North American grain sector vulnerable to change in United States-Soviet Union foreign relations. The latter event moved the United States directly into the hub of grain price determination in the world and thus fully integrated North American grain prices with economic events around the world. Within this economic-political setting the events and resulting prices since the early 1970's can be represented. The 1972 to 1979 events affecting supply, demand and price are not repeated here.

United States - Soviet Union Relations

Since early 1980, the structure of the world grain trade changed. The United States embargoed its exports to the Soviet Union to a minimal level in response to the Soviet invasion of Afganistan in December of 1979. The United States lifted the embargo in the spring of 1981, and has offered the U.S.S.R. attractive supplies of grain.

In response, or lack thereof, the Soviets have diversified their import requirements away from the United States while importing record amounts. The impact of this diversification can be illustrated by looking at the market share of exporters and their share of the Soviet market since the early 1970's.

Market Shares

World trade in wheat and coarse grains is currently just over 200 million tonnes. United States exports are around 55 percent of this trade (under 50 percent for wheat and over 60 percent for coarse grains, table 1). Soviet imports of wheat are just under 20 percent of the world wheat trade and their coarse grain imports are currently between 20 and 25 percent of world coarse grain trade.

The diversification of Soviet purchases (away from the United States) is vividly illustrated in Table 2. Between 1972 and 1979 the U.S. share of Soviet imports increased to 75 percent (11.2 million tonnes of a total of 15 million tonnes). Since then the U.S. share declined to 50 percent in 1979-80, 29 percent in 1980-81, and 34 percent last year. Even though last years market share was substantially below some previous year's levels, the absolute amount going from the United States to the Soviet Union was the largest -- 15.4 million tonnes out of 45 million tonne total. Argentine's market share of Soviet imports has flourished in the last three crop-years to approximately 30 percent. Argentina exports to the U.S.S.R. are over 10 million tonnes and before 1980 averaged just over 1 million tonne per annum. The Canadian share has also increased to about 20 percent of Soviet imports. The Australian and the EEC's share of Soviet imports has also increased in the last three years.

The dependence of exporters on Soviet imports is another telling feature of the world grain market structure. As shown in Table 3, the Soviet share of U.S. exports dropped from 14 percent in 1979/80 to 7 percent in 1980-81, and moved up to 14 percent again in 1981-82. In crop years 1980-81 and 1981-82 the Soviet share of Argentina exports was 80 percent and 74 percent, respectively. The Soviet share of Canada's exports increased to 36 percent last crop year. The share of Australian exports going to the Soviet Union also increased substantially since 1979-80.

Some Important Observations

The above market share data indicate a few features of the current world grain market. First, the United States is the major participant in the world grain market. Second, the Soviet Union is a major importer with highly variable imports. Third, since the U.S. embargo, non-U.S. exporters have supplied an increasing share of Soviet imports which results in increased dependence by those exporters on the Soviet Union as an export market. Finally, and not of least importance; (a) the U.S. share of Soviet imports has declined substantially in contrast to the 1970's; (b) the U.S. share of all world grain trade is not experiencing the growth rate in the 1980's as was the case in the 1970's, particularly, in coarse grain trade: (c) this data reinforces the notion that the United States is becoming the supplier of last resort to the Soviet Union; and (d) this means that as non-U.S. exporters have sufficient exportable supplies available for Soviet needs, then the United States market share of Soviet imports decreases substantially. This latter effect has overwhelming implications on price levels in North America. This occurs since lost export markets result in higher grain stocks and thus lower North American prices.

Grains Stocks and Price

Price serves to allocate resources and to equilibrate markets. When supplies exceed expected utilization, then price has to decline to stimulate additional use. Grain stocks at the end of a crop year relative to total utilization is an excellent barometer of the scarcity or abundance in the market. As stocks-to-use increases then price will naturally decline to reflect the abundance. In constrast, when supplies are scarce price must rise to allocate resources among competing uses.

The United States as the major participant in the world grain market is currently the holder of the majority of grain stocks. The data in Table 4 indicate that since the 1970's the United States has been holding a larger portion of world grain stocks. And, this translates into higher stocks-to-use ratios in the United States, table 5. These additional stocks do have a price depressing effect on North American grain prices. Importer's grain prices are also affected since they are linked to U.S. prices through exchange rates.

Import Tariffs

Import tariffs on grain entering Japan, the EEC and other nations also impacts on market structure. As illustrated by figure 1, import tariffs imposed by large importers reduce the export price, reduce trade from exporters, generate considerable tariff revenue for importers, increase internal prices and stimulate local production. The tariff imposed by importers can be optimal -- i.e., the gain in tariff revenue plus the producer grain more than offsets losses to consumers in the importing nation (Carter and Schmitz). In general, the greater the ability of an importer to

influence world prices by imposing a tariff, the larger the gain accruing to the importer from imposing the tariff. Referring back to figure 1, the larger area D is relative to areas B plus E, the greater the benefit from imposing tariffs. Tables 6 and 7 illustrate that the major wheat and coarse grain importers insulate their agricultural sectors from world prices. For the EEC, Japan and Spain, for example, this is through import tariffs and their imports represent a significant amount of world trade. Thus, their use of import tariffs can influence North American export prices over those levels that would exist if the tariffs did not exist. Most importantly, however, the attractiveness, or optimality of a tariff due its ability to depress price indicates the influence of the major importers' oligopsony power on the market. Establishing these tariffs also affects the market structure by making the import demand for grains very inelastic, or less responsive to price changes.

Transfer of income with these tariffs is quite real. Assuming a $80 tariff (EEC import levy were around this level in 1981-82) lowers U.S. export prices by $40/tonne, then importers save $8 billion of foreign exchange on 200 million tonnes traded. This $8 billion is a loss in exporters revenue from exports. This impact is larger when the influence of tariffs on trade volume is also included.

Soviet Grain Import Diversification and Price Determination

The current world grain market structure can be characterized by oligopsony powers affecting the determination of price. The large importers which protect their domestic agricultural sectors through tariffs are extracting economic rent from the exporters. These tariffs benefit importers because of their buying power and this benefit is the extraction of economic rent from exporters since the export price is below non-tariff levels.

The other large importer - the Soviet Union - is currently excerting its buying power not through import tariffs, but by selectively purchasing non-U.S. supplies. The Soviet Union benefits with this

monopsonistic strategy since resulting stocks in the United States are larger which, in turn, depresses U.S. and other exporter prices. The Soviets also affect U.S. prices by buying in small lots and timing purchases through the year in order to prevent an escalation in market prices. The psychology of the market can produce significant price advances when large purchases are announced in contrast to small timely spaced purchases.

In addition to the represention of the buying power of importers from tariffs, the impact of Soviet buying power can also be represented by separating the world grain trade into a U.S. component and a non-U.S. export component, figure 2. For the U.S. component, the exportable surplus (ESUS) and the import demand for U.S. exports (EDUS) are the appropriate relationships for analysis. As well, for the non-U.S. exporter component, representations of import demand for their exports (EDNUS) and the excess supply available for export (ESNUS) are required. These import demand relations are excess demands - the difference between domestic supply and consumption at various price levels. The structural impacts of tariffs on price responsiveness is already incorporated into these import demand relations. The excess supply relations capture the export availability after domestic utilization is accounted for.

The excess supply relations also reflect the price impacts of tight stocks. As exemplified in figure 3, when exports are high relative to export availability, then price starts to rise reflecting scarcity through tight stocks. That is, exports plus domestic use can not exceed producer marketings which can not exceed total supply.

The shape of the non-U.S. excess supply relation (ESNUS) is determined after the U.S. price is established, figure 2. This captures the central role of the United States in the world grain market as the price determining centre. Consequently, an assumption is maintained that non-U.S. export prices are established after U.S. export prices are formed. For example, when U.S. prices fall because of a decline in EDUS or an increase in ESUS, then the elastic (horizontal) portion of ESNUS drops by the amount of the decline in U.S. export prices. In other words, the non-U.S. export availability relation captures the large position of the United States in the world grain market with non-U.S. exporters as price takers - takers of U.S. prices. That is, because of its dominance, the United States can be considered a price leader.

The Impacts

Soviet diversification of imports result in EDUS shifting in and EDNUS shifting out by an equivalent amount. The ensuing lower U.S. exports and higher stocks has an immediate price depressing effect on the U.S. export price. Various econometric estimates infer that a 5 million tonne decrease in U.S. exports or increase in U.S. stocks will reduce U.S. prices by at least $12/tonne. Non-U.S. export prices may or may not fall by the same amount. The latter situation is one of non-U.S. exporter price premiums and will be discussed in a following section.

U.S. grain export grain revenue falls from the lower prices and the lower export volume. In the case of the non-U.S. exporters, export volume is up (which may make supplies tight) and export revenue can be enhanced or depressed. This depends on whether the additional exports (albeit at a lower price) offsets the lower value placed on the traditional export volume. Importers as a whole benefit since import prices in U.S. dollars are lower.

These costs and benefits can be estimated. Starting with the U.S. share of Soviet imports at more than 60 percent before 1980 and around 35 percent after 1980, this then corresponds to Soviet diversification away from the United States of 10 million tonnes. This amount can lower U.S. export prices by $25/tonne.(1) With total grain trade around 200 million tonnes, this price effect saves importers $5.0 billion per annum on foreign exchange (area A plus E in figure 2). The domestic impacts for importers may be larger when their domestic prices are related to world prices. With the Soviet Union representing 20 percent of the world grain trade (around 40 million tonnes) then this monopsony position saves their economy $1.0 billion per annum in foreign exchange.

The EEC because of its variable import levy generates additional revenue from the lower export prices. U.S. farmers and/or taxpayers indirectly transfer $4.1 billion (area A plus B plus C plus D in figure 2) to importers because of this Soviet buying power. Around $1.4 billion of this comes from lower export volumes (area D in figure 2). Internal implictions are larger since all production, not only exported production, is valued lower.

Canada has increased its exports by at least 3 million tonnes to the Soviet Union from a total export base of over 20 million tonnes. The $25 per tonne reduces the export value of base exports by $500 million (area E in figure 2) . An assumed $135/tonne new average export price on the additional 3 million tonnes enhances export revenue by $405 million, (area F in figure 2) for a net foreign exchange loss of $95 million.

---

(1) This impact multiplier of $25/tonne charge for an increase in stocks (decrease in exports) of 10 million tonnes corresponds to an impact multiplier of $.16/bu per 100 million bushels. This is a low estimate since many econometric studies estimate impact multipliers well over $.20/bu for each 100 million bushel charge.

Premiums on Non-U.S. Grains

After the U.S. embargo, premiums related to the embargo developed on non-U.S. grains and have disappeared in the 1982-83 crop year. The above representation illustrates the cause and potential for reoccurence of such premiums. These premiums develop because the movement of demand away from the United States to other exporters can result in tightness of non-U.S. stocks relative to U.S. stocks, figure 4. Table 4 indicates that U.S. stocks increased after 1980 and that non-U.S. stocks (particularly Canadian stocks) tightened relative to the late 1970's. Since stocks are relatively tight for non-U.S. exporters then their export prices will not fall in perfect parallel with U.S. prices. With these premiums the non-U.S. export price (PNUS2) can be above or below the base export price (PNUS1). The average importer still gains since U.S. prices are discounted to the base price. In fact, the average importer would be willing to pay a premium on non-U.S. grains of almost double the drop in U.S. prices versus the alternative of importing more from the United States and forcing U.S. prices back to base levels. For example, if U.S. prices dropped $12 per tonne, then premiums on non-U.S. grains of up to $20 per tonne can easily exist. When premiums do exist, particularly above the base price, then non-U.S. exporters are gaining from the Soviet buying behavior in the market place. Referring back to figure 2, this gain stems from from area E being smaller and possibly representing a net addition before considering the contribution of area F.

One of the reasons for the premium on barley during the 1979-80 and 1980-81 crop year was this diversification of Soviet imports away from the United States. This premium has disappeared in crop year 1982-83 since production has been plentiful for most exporters and thus non-U.S. stocks are adequate for anticipated utilization. In terms of figure 4, ESNUS has shifted further to the right (export availability has increased) and the intersection of ESNUS and EDNUS can be represented by that in figure 2.

Improving Export Prices by Moving to a Oligopolistic Grain Market

The representation of market structure by Carter and Schmitz and the above representation of the impacts of Soviet diversification both indicate that large amounts of income are being extracted by importers. The inferred importer behavior tips the balance of power in the international grain market in favour of importers. Or, on the oligopsonistic side of the market. The burdensome exporter stocks, particularly in the United States, make the current market even more of a buyers market. Clearly, grain stocks within the United States need to be reduced, but subsidizing exports is not a cost effective approach nor does it help the grain sector until stocks are reduced to more meaningful levels.

A cost effective solution to the surplus stocks problem is not to give them away, but rather to keep them off the market and extract the economic rent that is currently going to the importers. A reduction in the economic power of the importers can only come through severing the price link that currently exists between exporters and importers. By doing so in an agreed cooperative manner, then exporters can extract some of the economic rent that is currently accruing to importers. To do so, however, requires full agreement and cooperation from the United States.

Exporter Cooperation

The U.S. export system does not facilitate exporter cooperation and extraction of this oligopsony economic rent through higher prices. A means to achieve these higher prices is through export taxes and agreement on market share. Groenewegen and Cochrane have argued that export taxes in the United States should not be considered unconstitutional when these taxes are used to regulate a domestic sector and prices, and not to explicitly generate revenue. The United States must lead in this direction. The other exporters can use

export taxes or other legislated means to achieve the export price. With the U.S. instituting an export tax, then in all probability domestic prices in these other export nations could reach the export price unless an export tax was instituted.

Export taxes set at a mutually agreed level to achieve export prices will permit the exporters to extract all or some of the economic rent now going to the importers, figure 5. In the case of the EEC, the variable export tax could eliminate all or some of the revenue from the variable import levy. At the same time, the EEC would not be generating the revenue it uses to finance their export subsidy program.

In each country, the export companies or export agencies would have to clear export sales through its national representation to the exporter oligopoly, or cartel. This body would also collect the export tax from the export companies or agencies.

The royalties collected with the export tax should not all go directly to the farm sector. To do so would encourage excess production. Moreover, domestic prices should be set at such a level that it does not generate excess production and, therefore, permanent production controls would not be necessary. Some of the tax revenue would ensure that domestic grain prices are at average cost of production levels. A major part of the royalties should be used to pay for domestic programs which harmonize the variability in output with the export needs. Each exporting nation will have to have a buffer or reserve program to keep excess supplies due to good weather off of the domestic market. When this is not done, domestic prices could prove disastrous to farmers. It should be noted that with the export tax the taxpayer does not have to pay for the farm programs of commodities that are export orientated.

Along with the export tax, an allocation of markets between major exporters is required within the exporter oligopoly. This will require an institutional innovation. Since this is a paying proposition to exporters, agreement on market share among exporters should be achievable.

Raising export prices will generate some hardship to developing countries. As an offset, some of the royalty collected should be transfered to the developing nation to achieve the same result as exporting at price levels comparable to exporter domestic prices. The income transfer should not be as a direct price subsidy since this could result in re-exporting to non-subsidized importers. Instead, the transfer should be directly to the importing agency or government, and possibly in terms of food aid. This is consistent with the many developing country policies that subsidize consumer food costs.

With the export tax all grain marketed in the United States would be priced as it is today (through the grain exchanges). Since the domestic and export markets are separated by the variable export tax, trading activity on the grain exchanges may drop in response to stable or fixed U.S. export prices. However, information on domestic production, utilization and potential export demand is still needed in the price discovery and resource allocation process.

Potential Supply Response in the Rest of the World

A potential intermediate term impact of raising world grain prices through an export tax is the supply response within importing nations and fringe exporters. This becomes a concern when the resulting world price rise is significantly above current costs of production and the new return to resources is sufficient to bring new resources into production or shift current resources out of other uses. Any additional supply will only come from those non-oligopoly members that permit world price changes to be mirrored internally. Additional

supply reduces the export opportunity for the exporter members and thus export revenue declines. If this supply response is significant then the oligopoly would be a short-lived venture (3 to 5 years) and price could be lower after this period compared to when the export tax was instituted.

The level of the resulting world price is crucial. An extremely high price will encourage supply response in some importing nations and non-oligopoly exporter countries. A price increase of just $40/tonne from today's low prices would just bring grain prices back to 1981 levels. More importantly, however, this price rise may not induce a large response in supply since the price rise may have just risen enough to approach total costs of production. That is, returns may not be high enough to bring a large number of additional resources into production. Further, any devaluation of the U.S. dollar would offset rises in U.S. export prices.

The additional supply response in the rest of the world is reflected in the excess demand relation ED2 in figure 5. Trade currently is at QT2 and imposition of an export tax results in trade of QT3. This lower level of trade will not all occur immediately. Some of the reduction will occur immediately because of reduced utilization in those importing nations directly linked to world prices. The reduction due to supply response will occur one to three or more years later, after resources are put in place to expand production in importing nations linked to world prices and in the fringe exporters. As illustrated in figure 5, if the intermediate run elasticity of excess import demand is low, there may be little supply response in the rest of the world.

Tables 6 and 7 illustrate that any major supply response will likely not be forthcoming from the major importers of both wheat and coarse grains, unless they alter their agricultural policies. These nations insulate domestic prices from world prices and thus the higher world

prices by themselves will not stimulate additional production. The tables are not an exhaustive list of the importers which insulate their domestic agricultural sectors. For more detail see Jabara and USDA, F6-21-81. An econometric model by Chute of the world wheat market suggests that their is very little transmission of world prices to both procedures and consumers in importing nations.

In the case of coarse grains, there may be some supply response in Brazil. Coarse grain prices in Brazil are linked to world prices and Brazil has the capacity to expand acreage into corn. Currently, Brazil exports small quantities of corn, even though it is a net importer. Potential for production increases exists since Brazilian corn yields are 30 percent of Canada's and around 50 percent of Argentinian corn yields. Also, its corn production is on 25 percent of the total cropped area. A 50 percent improvement in Brazilian corn yields would result in 10 to 12 million tonnes of additional corn that could be placed on the export market. This volume would significantly lower world corn prices. Thus Brazilian corn production could work against collusive exporter activity if export prices were raised to such a level to increase investments into Brazilian corn production.

The potential exports of fringe exports or very small importers with significant production capability suggests that if an exporter oligopoly does not cautiosuly and prudently set export prices, then the enforcement of export prices could end up being an intermediate term venture.

REFERENCES

Alouze, C.M., D.S. Watson, and N.H. Sturgess. "Oligopoly Pricing in the World Wheat Market." Amer. J. of Agr. Econ. 60(1978): 173-85.

Carter, C. and A. Schmitz. "Import Tariffs and Price Formation in the World Wheat Market." Amer. J. of Agr. Econ. 61(1979):517-22.

Chute, R.G. "An Econometric Model of the World Wheat Market: A Cartel Simulation." M.Sc. Thesis, University of Guelph, 1983.

Groenewegen, J.R., and W.W. Cochrane, "A Proposal to Further Increase the Stability of the American Grain Sector." Amer. J. of Agr. Econ. 62(1980):806-811.

Jabara, C.L. "Trade Restrictions in International Grain and Oilseed Markets: A Comparative Country Analysis." FAER-162, Economics and Statistics Service. U.S. Sept. Agr., Jan. 1981

McCalla, A.F. "A Duopoly Model of World Wheat Pricing." J. Farm Econ. 48 (1966):711-27.

Oleson B.T. "Price Determination and Market Share Formation in the International Wheat Market." Ph.D. Thesis, University of Minnesota, 1979.

Schmitz, A., A.F. McCalla, D.O. Mitchell, and C. Carter "Grain Export Cartels." Cambridge, Mass.: Ballinger Publishing Company, 1981.

Taplin, J.H. "Demand in the World Wheat Market and the Export Policies of the United States, Canada and Australia." Ph.D. Thesis, Cornell University, 1969.

U.S. Department of Agriculture, Foreign Agricultural Service. "National Wheat and Corn Prices and Summary of National Grain Marketing Systems." FG-21-81, May 26, 1981.

TABLE 1. SOVIET GRAIN IMPORTS, UNITED STATES GRAIN EXPORTS AND THEIR SHARES OF WORLD TRADE, JULY/JUNE CROP-YEARS.

	World Grain Trade					World Wheat and Flour Trade			World Coarse Grain Trade		
Crop-Year	Total	as U SSR Imports	%	as US Exports	%	Total	% USSR Imports	% US Exports	Total	% USSR Imports	% US Exports
1970-71	101	1	1	39	39	55	1	36	46	1	42
1971-72	101	10	10	38	37	52	7	33	49	14	42
1972-73	126	23	18	67	53	67	23	47	59	12	60
1973-74	134	11	8	76	56	63	7	49	71	9	63
1974-75	129	5	4	62	48	64	4	44	65	4	53
1975-76	142	26	18	78	55	67	15	47	75	21	62
1976-77	146	10	7	77	53	63	7	41	83	7	61
1977-78	157	18	12	84	53	73	9	43	84	14	62
1978-79	162	15	9	89	55	72	7	45	90	11	63
1979-80	187	31	16	109	58	86	14	43	101	18	71
1980-81	199	34	17	114	57	94	17	45	106	17	69
1981-82	206	45	22	111	54	102	19	48	104	25	59
1982-83	201	39	19	111	55	100	17	46	102	23	64

Note: July/June Crop-Years, Trade is in million tonnes

Source: U.S.D.A. Foreign Agriculture Circulars

TABLE 2. EXPORTERS MARKET SHARE OF USSR GRAIN IMPORTS

Crop-Year	Soviet Grain Imports (million tonnes) Total	from U.S.	%	from Argentina	%	from Canada	%	from Australia	%	from EEC	%	from Others	%
1971-72	10.3	2.9	28.2	-	-	3.5	33.9	-	-	-	-	-	-
1972-73	22.5	13.7	60.9	.1	0.4	5.1	22.7	.9	4.0	1.9	8.4	.8	3.6
1973-74	10.9	7.9	72.5	.3	2.8	1.8	16.5	.1	0.9	.5	4.6	.3	2.8
1974-75	5.2	2.3	44.2	1.8	34.6	.3	5.8	.9	17.3	.1	1.9	.1	1.9
1975-76	25.7	13.9	54.1	1.4	5.5	4.5	17.5	2.0	7.8	.5	2.0	3.0	11.7
1976-77	10.3	7.4	71.8	.3	2.9	1.4	13.6	.5	4.9	.2	1.9	.3	2.9
1977-78	18.3	12.5	68.3	2.7	14.8	1.9	10.4	.3	1.6	.2	1.1	.8	4.4
1978-79	15.0	11.2	74.7	1.4	9.3	2.1	14.0	.1	0.7	.2	1.3	.1	0.7
1979-80	30.5	15.2	49.8	5.1	16.7	3.4	11.2	4.0	13.1	.9	3.0	1.8	5.9
1980-81	34.0	8.0	23.5	11.2	32.9	6.8	20.0	2.9	8.5	1.5	4.4	4.0	11.8
1981-82	45.0	15.4	34.2	13.3	29.6	9.2	20.4	2.5	5.6	2.4	5.3	2.2	4.9
1982-83	39.0	-	-	-	-	-	-	-	-	-	-	-	-

Note: Includes both Wheat and Coarse Grains

Sources: USDA Foreign Agriculture Circular and Statistics Canada

TABLE 3. GRAIN EXPORTS OF MAJOR EXPORTERS: TOTAL EXPORTS AND USSR SHARE OF EXPORTS (in million tonnes)

Crop-Year July/June	World			U.S.			Argentina			Canada			Australia			EEC			Others		
	Total	USSR	%	Total	USSR	%	Total	USSR	%	Total	USSR	%	Total	USSR	%	Total	USSR	%	Total	USSR	%
1971-72	101.0	10.3	10	37.7	2.9	8	-	-	-	19.2	3.5	18	-	-	-	-	-	-	-	-	-
1972-73	126.0	22.5	18	67.4	13.7	20	7.7	.1	1	19.9	5.1	26	7.3	.9	12	10.1	1.9	19	13.6	.8	6
1973-74	133.9	10.9	8	75.6	7.9	10	9.6	.3	3	14.6	1.8	12	7.4	.1	1	10.5	.5	5	16.2	.3	2
1974-75	129.2	5.2	4	62.4	2.3	4	10.7	1.8	17	14.0	.3	2	11.5	.9	8	10.8	.1	1	18.4	.1	1
1975-76	143.8	25.7	18	77.8	13.9	18	8.6	1.4	16	17.1	4.5	26	11.1	2.0	18	13.0	.5	4	15.3	3.0	20
1976-77	145.9	10.3	7	76.7	7.4	10	15.1	.3	2	17.5	1.4	8	11.8	.5	4	9.1	.2	2	15.4	.3	2
1977-78	156.8	18.3	12	83.6	12.5	15	13.6	2.7	20	19.6	1.9	10	13.0	.3	2	10.5	.2	2	16.6	.8	5
1978-79	162.2	15.0	9	89.2	11.2	13	14.8	1.4	9	17.3	2.1	12	9.3	.1	1	14.0	.2	1	17.5	.1	1
1979-80	186.9	30.5	16	108.8	15.2	14	11.4	5.1	45	19.8	3.4	17	19.0	4.0	21	15.4	.9	6	12.3	1.8	14
1980-81	199.4	34.0	17	114.3	8.0	7	13.8	11.2	80	21.6	6.8	31	12.8	2.9	23	19.2	1.5	6	16.9	4.0	24
1981-82	205.5	45.0	22	110.5	15.4	14	17.9	13.3	74	25.2	9.2	36	14.1	2.5	17	18.3	2.4	13	16.7	2.2	13
1982-83	201.2	39.0	19	111.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: all data is in July/June years except Canada from 1960/61 to 1971/72 which is in Aug./July years.

Source: USDA Foreign Agriculture Circular and Statistics Canada

TABLE 4. WORLD GRAIN STOCKS (in million tonnes)

Crop-Year July-June	World Grain Stocks					World Wheat Stocks					World Coarse Grain Stocks				
	Total	in US	%	in Canada	%	Total	in US	%	in Canada	%	Total	in US	%	in Canada	%
1960-61	189.0	115.8	61.27	21.1	11.16	79.4	38.4	48.36	16.6	20.91	109.7	77.4	70.56	4.5	4.10
1961-62	162.2	101.7	62.70	13.4	8.26	67.5	36.0	53.33	10.6	15.70	94.7	65.7	69.38	2.8	2.96
1962-63	164.6	91.1	55.35	17.8	10.81	71.9	32.5	45.20	13.3	18.50	92.7	58.6	63.21	4.5	4.85
1963-64	163.2	87.6	53.68	18.1	11.09	65.3	24.5	37.52	12.5	19.14	97.9	63.1	64.45	5.6	5.72
1964-65	164.4	76.5	46.53	18.3	11.13	73.4	22.2	30.25	14.0	19.07	90.9	50.0	55.01	4.3	4.73
1965-66	130.4	58.2	44.63	15.9	12.19	55.3	16.6	30.02	11.4	20.61	75.1	38.7	51.53	4.5	5.99
1966-67	158.2	49.5	31.29	20.5	12.96	82.1	11.6	14.13	15.6	19.00	76.1	34.2	44.94	4.9	6.44
1967-68	175.8	62.7	35.67	22.6	12.86	90.6	14.7	16.23	18.3	20.20	85.2	44.4	52.11	4.3	5.05
1968-69	204.2	71.8	35.16	29.9	14.64	115.1	22.2	19.29	23.2	20.16	89.2	46.0	51.57	6.7	7.51
1969-70	187.1	72.9	38.96	34.6	18.49	97.8	26.8	27.40	27.5	28.12	89.2	46.1	51.68	7.1	7.96
1970-71	146.5	54.5	37.20	25.5	17.41	74.2	22.4	30.19	20.0	26.95	72.2	32.2	44.60	5.5	7.62
1971-72	167.8	73.4	43.74	22.1	13.17	80.9	26.8	33.13	15.9	19.65	87.0	46.6	53.56	6.2	7.13
1972-73	132.4	48.0	36.25	15.8	11.93	62.6	16.2	25.88	9.9	15.81	69.8	31.7	45.42	5.9	8.45
1973-74	134.5	31.1	23.12	16.3	12.12	70.2	9.3	13.25	10.1	14.39	64.3	21.8	33.90	6.2	9.64
1974-75	122.6	27.3	22.27	13.6	11.09	64.0	11.8	18.44	8.0	12.50	58.6	15.5	26.45	5.6	9.56
1975-76	122.1	35.5	29.07	12.7	10.40	64.1	18.1	28.24	8.2	12.79	58.0	17.3	29.83	4.5	7.76
1976-77	177.0	60.3	34.07	18.4	10.40	99.8	30.3	30.36	13.3	13.33	77.2	30.0	38.86	5.1	6.61
1977-78	170.1	73.5	43.21	19.7	11.58	84.4	32.1	38.03	12.1	14.34	85.7	41.5	48.42	7.6	8.87
1978-79	192.1	71.6	37.27	21.6	11.24	101.0	25.1	24.85	14.9	14.75	91.1	46.4	50.93	6.7	7.35
1979-80	171.6	77.3	45.05	14.3	8.33	80.1	24.5	30.59	10.7	13.36	91.5	52.7	57.60	3.6	3.93
1980-81	154.9	61.6	39.77	12.7	8.20	74.7	26.9	36.01	8.4	11.24	80.2	34.7	43.27	4.3	5.36
1981-82	192.9	100.2	57.94	14.9	7.72	83.1	31.5	37.91	9.6	11.55	109.8	68.7	62.57	5.3	4.83
1982-83	224.3	133.1	59.34	17.9	7.98	91.5	39.0	42.62	11.7	12.79	132.9	94.2	70.88	6.2	4.67

Source: USDA FAC Oct 15/82 and Previous issues.

TABLE 5. UNITED STATES GRAIN STOCKS AND STOCKS-TO-USE RATIOS

Crop-Year	Wheat and Coarse grain		Wheat		Coarse Grains	
	Stocks	as % of Utilization	Stocks	as % of Utilization	Stocks	as % of Utilization
1960-61	116	69	-	-	-	-
1961-62	102	58	-	-	-	-
1962-63	91	54	-	-	-	-
1963-64	88	50	-	-	-	-
1964-65	77	44	-	-	-	-
1965-66	58	29	-	-	-	-
1966-67	50	26	-	-	-	-
1967-68	63	33	-	-	-	-
1968-69	72	38	-	-	-	-
1969-70	73	36	-	-	-	-
1970-71	55	27	22	54	32	20
1971-72	73	34	27	68	47	27
1972-73	48	19	16	31	32	16
1973-74	31	12	9	17	22	11
1974-75	27	13	12	26	16	10
1975-76	36	15	18	35	17	9
1976-77	60	26	30	65	30	16
1977-78	74	30	32	59	42	21
1978-79	72	26	25	45	46	21
1979-80	77	27	25	42	53	23
1980-81	62	22	27	43	35	16
1981-82	100	35	32	44	69	32
1982-83	133	45	39	56	94	41

Note: Stocks are in million tonnes

TABLE 6. WHEAT IMPORTERS WHICH INSULATE INTERNAL PRICES FROM WORLD PRICES (a)

Importers (b):	Production	as a percent of world production	Imports	as a percent of total imports
	- million tonnes -	- % -	- million tonnes -	- % -
USSR	98.2	22	16.0	17
China	54.2	12	13.8	15
Eastern Europe	34.5	8	6.1	6
Japan	.6	-	5.8	6
Egypt	1.8	-	5.6	6
Brazil	2.7	1	3.9	4
Korea	.1	-	2.0	2
Total above (c)	192.1	44	53.2	57
All importers	281 (d)	64	94.0	100

(a) Data are from the 1980-81 crop-year with world production at 439 Mt.

(b) The EEC also insulates domestic prices from world prices, however the EEC is a net exporter. EEC imports are approximately 4.5 million tonnes.

(c) The nations are from Jabara and represent only the major insulating importers. As a result, a larger part of world imports may go to those importers.

(d) Estimated as total world production minus production in the 5 major exporter countries.

TABLE 7. COARSE GRAIN IMPORTERS WHICH INSULATE INTERNAL PRICES FROM WORLD PRICES(a)

Importers	Production	as a percent of world production	Imports	as a percent of total imports
	- million tonnes -	- % -	- million tonnes -	- % -
USSR	91	12	19	18
EEC	70	10	12.4	12
Eastern Europe	61.6	8	10.6	10
Spain	1.9	-	4.5	4
Korea	1.0	-	2.9	3
Taiwan	.1	-	3.7	3
Japan	2.4	-	1.5(b)	1
China	82.5	11	.9	-
Total above (c)	310.5	42	55.5	52
All importers	468(d)	64	106	100

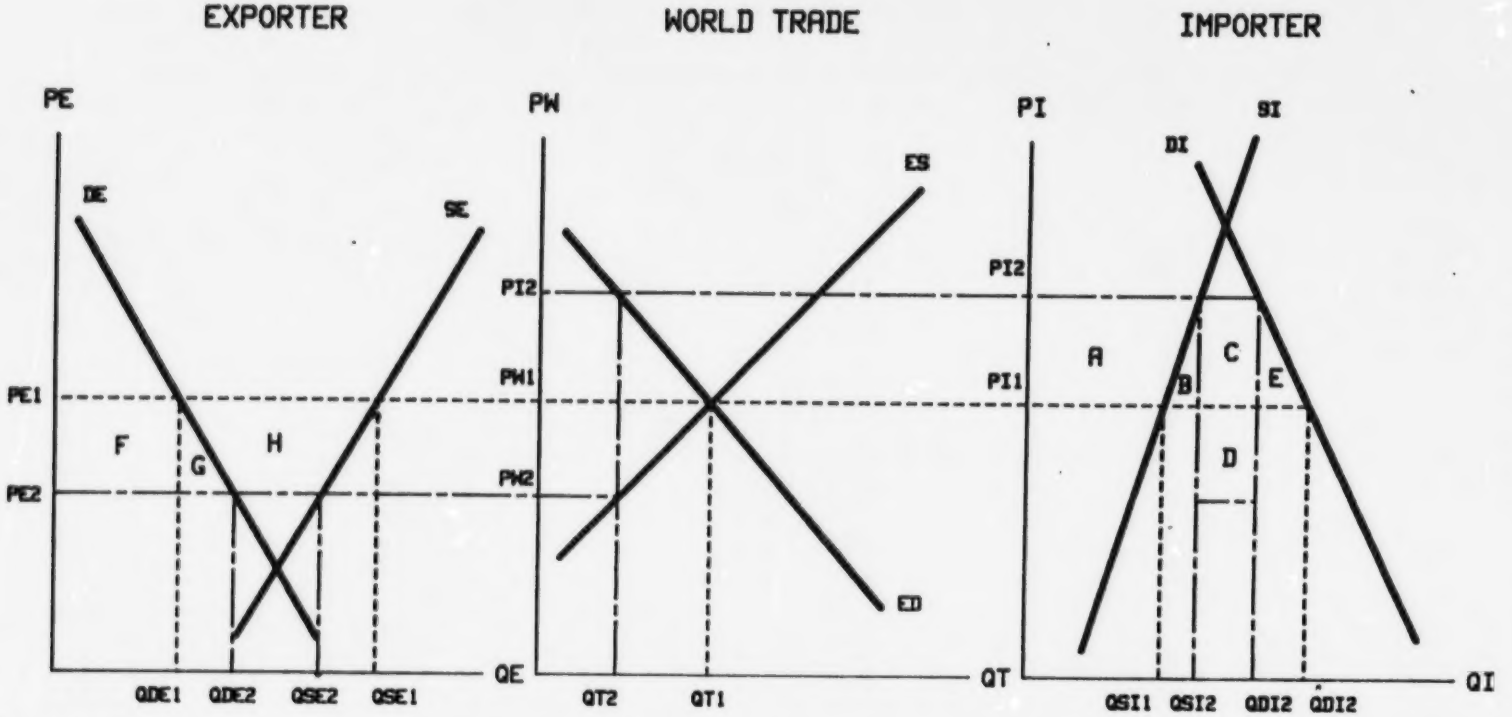
(a) Data are from the 1980-81 crop-year with world production at 730 million metric tonnes.

(b) Japan imports around 19 million tonnes of coarse grain - of this amount only barley at 1.5 million tonnes have domestic price supports.

(c) The nations are from Jabara and represent only the major insulating importers. As a result, a larger portion of world trade may go to these nations.

(d) Estimated as total world production minus production in the 5 major exporter countries.

Figure 1 - IMPACTS OF AN IMPORT TARIFF



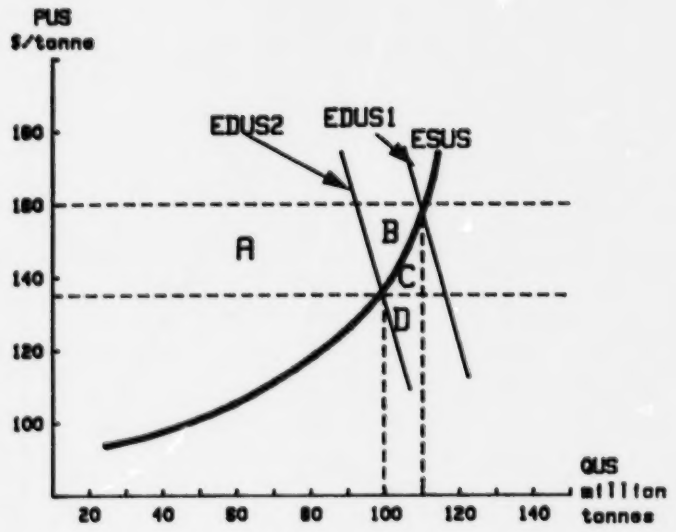
WHERE: DE=exporter domestic demand; SE=exporter supply; ES=exporter excess supply available for export export (SE-DE); DI=importer domestic demand; SI=importer supply; ED=excess demand for imports (DI-SI)

NON-TARIFF SOLUTION: PE1=PW1=PI1; QT1=QSE1-QDE1=QDI1-QSI1

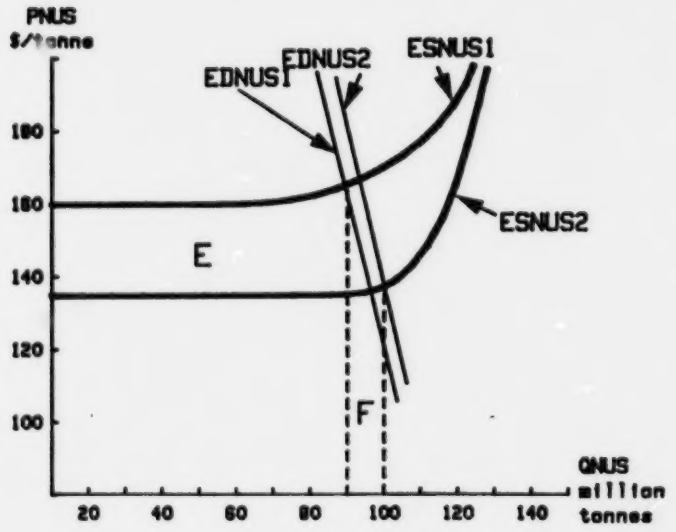
TARIFF SOLUTION: Tariff=PI2-PW2; QT2=QSE2-QDE2=QDI2-QSI2
Tariff Revenue=C+D; Importer Producer Gain=A; Importer Consumer Loss =A+B+C+E; Net Importer Gain when D>B+E; Exporter Producer Loss=F+G+H; Exporter Consumer Gain=F+G

Figure 2 - IMPACT OF SOVIET DIVERSIFICATION ON THE GRAIN MARKET

UNITED STATES



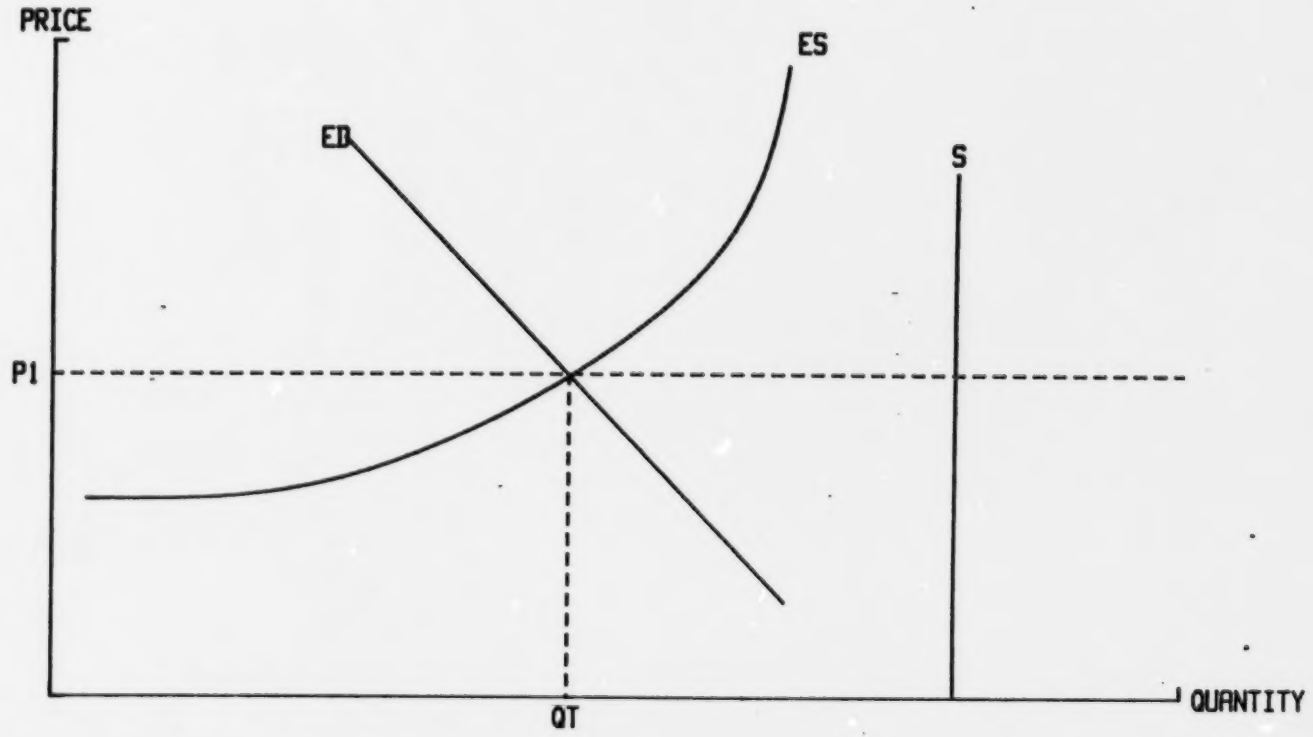
NON-U.S. EXPORTERS



WHERE: EDUS=import demand for U.S. exports; ESUS=U.S. export supply availability; EDNUS=import demand for non-U.S. exports; ESNUS=non-U.S. exporter supply available for export

IMPACTS: 1) EDUS shifts to EDUS2, EDNUS shifts to EDNUS2 and ESNUS follows the drop in U.S. prices
2) U.S. exports fall from 110 to 100 million tonnes; non-U.S. exports increase from 90 to 100 million tonnes; U.S. average grain price falls from $160/tonne to $135/tonne
3) U.S. export earning loss (A+B+C+D)=$-4.1 billion (quantity=$-1.35 billion, price=$-2.75 billion)
4) Non-U.S. export earning loss=$-.9 billion (quantity=$+1.35 billion, price=$-2.25 billion
5) Importer foreign exchange gain=$5 billion with $1 billion to the Soviet Union

Figure 3 - RELATION BETWEEN EXCESS SUPPLY AVAILABLE FOR EXPORT, STOCKS AND PRODUCTION



WHERE: S = total supplies (production plus carry-in stocks)
ES = excess supply available for export (marketings minus domestic utilization)
S-ES = carry-out stocks (QS-QT with QT exports) plus domestic utilization
ED = import demand

Figure 4 - NON-U.S. EXPORT PRICE PREMIUMS

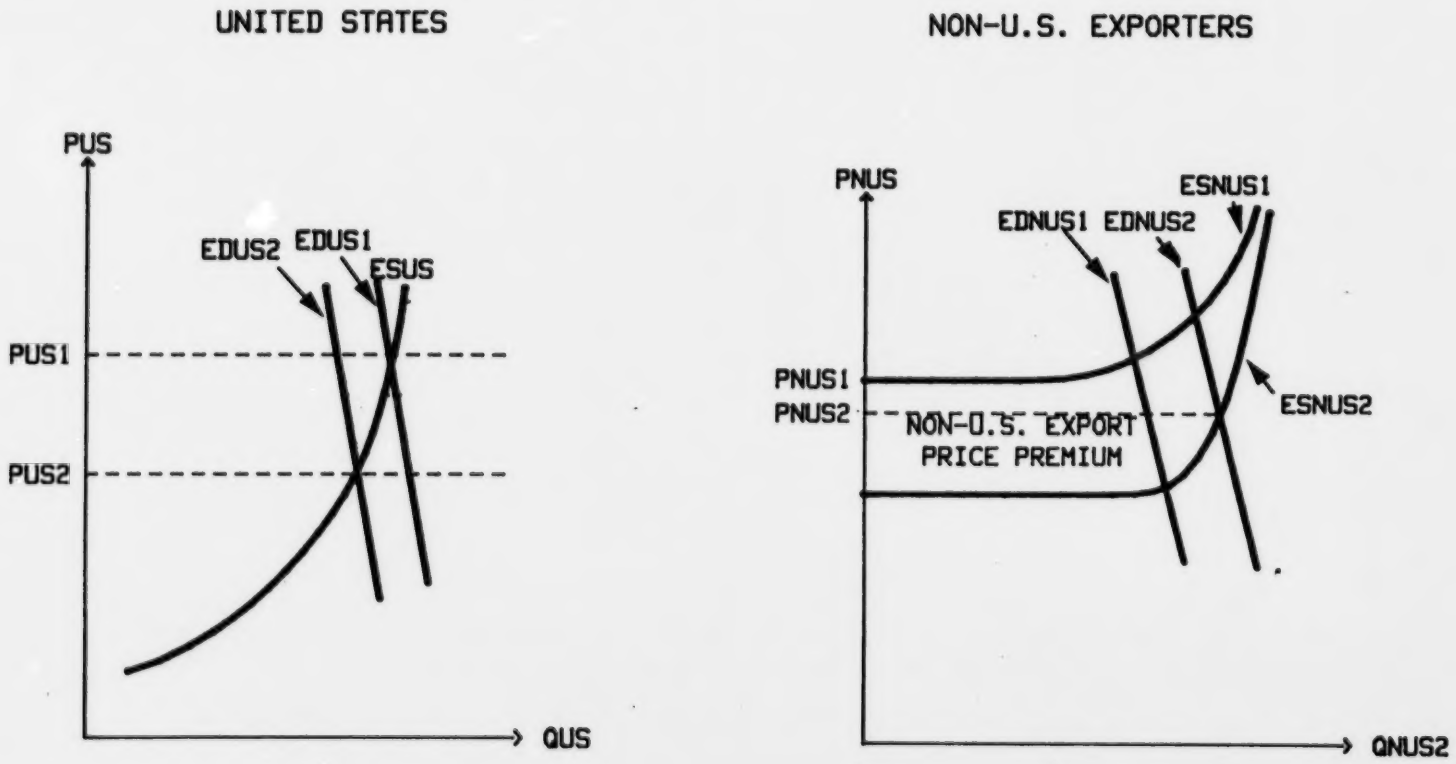
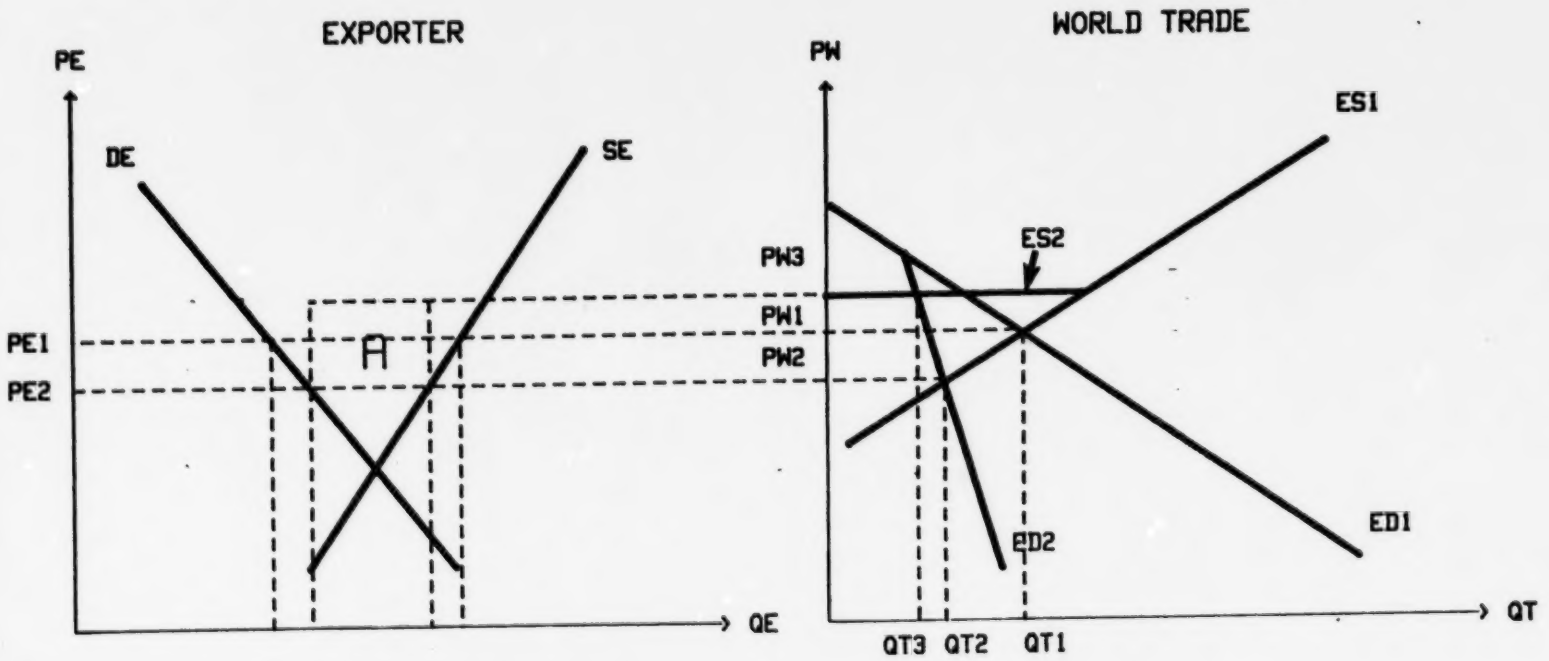


Figure 5 - ILLUSTRATION OF A VARIABLE EXPORT TAX TO ESTABLISH AN EXPORT PRICE



WHERE: symbols are as defined in figure 1
PE1=PW1=non-tariff price; QT1=trade with no tariffs
PE2=PW2=exporter price with import tariffs; QT2=trade with tariffs
PW3=export price; PW3-PW2=variable export tax; PW2=exporter producer price
A=export tax revenues; QT3=trade with an export tax